REMARKS/ARGUMENTS

Claims 17-18, 25-26, 33-34, and 41-42 are pending.

Claims 1-16, 19-24, 27-32, 35-40, and 43-44 have been cancelled.

Support for the amendments is found in the claims and specification, as originally filed. No new matter is believed to have been added.

The rejections of claims 13-16 and 19-20 under 35 U.S.C. 103(a) over the combinations of Yoichi et al., JP 10088256 ("JP '256"), Shotaro et al., JP 2000128648 ("JP '648"), Jung et al., App. Surf. Sci., 193:129-137 (2002), and Reddy et al., J. Mat. Sci., 37:929-934 (2002) are not applicable to the claims filed herewith because claims 13-16 and 19-20 have been canceled.

Applicants request that the rejections be withdrawn.

Claim 17 is rejected under 35 U.S.C. 103(a) over the combinations of JP '256 and JP '648.

Claim 18 is rejected under 35 U.S.C. 103(a) over the combinations of JP '256 and JP '648, in view of Jung et al., App. Surf. Sci., 193:129-137 (2002).

Claims 21-28 and 29-44 are rejected under 35 U.S.C. 103(a) over the combinations of various references including JP '256, JP '648, and Jung et al., App. Surf. Sci., 193:129-137 (2002). Claims 19-24, 27-32, 35-40, and 43-44 have been cancelled. Claims 25, 33, and 41 depend upon claim 17 and are ejected under 35 U.S.C. 103(a) over JP '256 and JP '648. Claims 26, 34, and 42 depend upon claim 18 and are ejected under 35 U.S.C. 103(a) over JP '256, JP '648, and Jung et al.

The combinations of the references do not describe or suggest "the knead-dispersed material heat treatment process of heating the knead-dispersed material obtained by said mixing process by discharge plasma without sintering by allowing pulse current to flow while

clamping the knead-dispersed material between the punches in the die with a pressure of 10 MPa or less" (as in (b) of claim 17 and (c) of claim 18).

In the claimed method, a mixed knead-dispersed material is heat treated by discharge plasma without sintering at a given temperature. The method provides excellent homogenization and dispersion of carbon nanotubes in the form of a network, which are dispersed and integrated in the resulting sintered body, and an intended electric conductivity, heat conductivity and strength are also improved (page 6, first full paragraph, of the present specification).

The claimed process of further treatment by discharge plasma of the knead-dispersed material obtained in a dry mode or a wet mode or both is carried out before the discharge plasma sintering process, which provides further progress of the disassembly of the knead-dispersed material, stretching a carbon nanotube, a surface activation, diffusion of a powder. Also, a heat conductivity and an electric conductivity imparted to a sintered body are improved, together with the subsequent smooth progress of the discharge plasma sintering (page 15, first full paragraph, of the present specification).

Examples of the specific treatment conditions include temperature in a range of 200 to 1400°C, time in a range of 1 to 15 minutes, and pressure in a range of 0 to 10 MPa (page 15, second full paragraph, of the present specification). The pressure in the claimed process is low. *See* corresponding Example 4-2, Example 5-3, Example 12-2, Example 12-3 and Example 13 of the present specification.

With reference to FIGS. 8, 9 and 10, the figures depict results of the discharge plasma treatment performed on the knead-dispersed material described in Example 12-3. Specifically, in FIG. 8 (showing the state before the discharge plasma treatment), carbon nanotubes appear to simply exist on an aluminum particle though carbon nanotubes adhere to an aluminum particle by knead-dispersion. However, when discharge plasma treatment is

performed on the knead-dispersed material, carbon nanotubes adhere to an aluminum particle by breaking into the particle as shown in FIGS. 9 and 10 (Example 12-3, page 36, third full paragraph of the present specification). This phenomenon provides an advantageous improvement in the heat conductivity and electric conductivity.

The Examiner has alleged that it would have been obvious to synthesize a carbon nanotube composite material of JP '256 by using the discharge plasma sintering process of JP '648, and the process of performing the discharge plasma treatment on the knead-dispersed material is equivalent to the process of sintering the knead-dispersed material. Applicants respectfully disagree because the discharge plasma treatment and the discharge plasma sintering to be performed on the knead-dispersed material are not equivalent procedures.

Specifically, the discharge plasma treatment is explicitly distinguished from the discharge plasma sintering in the claimed method and the present specification because it is a treatment which is completely independent of sintering, in terms of the heat treatment to be performed under a condition which does not lead to sintering. Accordingly, the claimed discharge plasma treatment, which does not lead to the sintering and is performed prior to the sintering, would not have been obvious over the combinations of the cited references.

Moreover, Example 4-2 describes that "[t]hen, the knead-dispersed material was filled in a die of a discharge plasma sintering apparatus, and treated by discharge plasma at 575°C for 5 minutes. Then, the knead-dispersed material was sintered by discharge plasma at 800°C for 15 minutes in a discharge plasma sintering apparatus. In this procedure, the temperature raising rate was 100°C/min and a pressure of 60 MPa was loaded continuously." *See* page 23, second and third paragraphs of the present specification. Example 5-3 describes that "[t]he knead-dispersed material was filled in a die of a discharge plasma sintering apparatus, and treated by discharge plasma at 575°C for 5 minutes. Then, the knead-dispersed material was sintered by discharge plasma at 1350°C for 5 minutes in a discharge plasma sintering

apparatus. In this procedure, the temperature raising rate was 100°C/min and a pressure of 60 MPa was loaded continuously." *See* page 26, first full paragraph of the present specification.

Example 12-2 describes that "[t]he knead-dispersed material was filled in a die of a discharge plasma sintering apparatus, and treated by discharge plasma at 800°C for 5 minutes. Thereafter, the knead-dispersed material was sintered by discharge plasma at 600°C for 5 minutes in a discharge plasma sintering apparatus. In this procedure, the temperature raising rate was 100°C/min and a pressure of 50 MPa was loaded continuously." *See* page 34-35, the bridging paragraph of the present specification.

Example 12-3 describes that "[t]he knead-dispersed material was filled in a die of a discharge plasma sintering apparatus, and treated by discharge plasma at 400°C for 5 minutes. Thereafter, the knead-dispersed material was sintered by discharge plasma at 600°C for 5 minutes in a discharge plasma sintering apparatus." *See* page 35, last paragraph of the present specification.

Thus, it is clear from the present specification that the discharge plasma treatment to be performed on the knead-dispersed material corresponds to heat treatment which does not lead to sintering, and, therefore, is explicitly distinguished from discharge plasma sintering which leads to sintering, in terms of not only a result, but also conditions, in particular, pressure (the pressure in the discharge plasma treatment is 10 MPa or less). Further, the discharge plasma treatment which does not lead to sintering is performed prior to the discharge plasma sintering, so that the unique effects are produced.

The cited references do not describe or suggest the discharge plasma treatment to be performed prior to the discharge plasma sintering.

Further, the discharge plasma treatment to be performed prior to the discharge plasma is not obvious because it is clearly different from and is not equivalent to the discharge

plasma sintering in terms of results, conditions and the action and effect. Thus, cited references do make the claimed process obvious.

Applicants request that the rejection be withdrawn.

A Notice of Allowance for all pending claims is requested.

Respectfully submitted,

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